We claim:

1. A method for storing a plurality of binary numbers such that said binary numbers can be searched for match between a candidate binary number and one of said plurality of binary numbers, the method comprising:

a) sorting said plurality of binary numbers in order of numerical value;

b) grouping said plurality of binary numbers into subgroups, each binary number in a subgroup having at least one leading bit in common with other binary numbers in said subgroup;

c) for each of said subgroups, determining a number x of leading bits common to members of said subgroup;

d) for each subgroup, recording said number x of leading bits;

f) for each subgroup, creating stripped binary numbers by removing x leading bits from members of said subgroup; and

g) storing each of said stripped binary numbers for each subgroup in a node data structure in a tree data structure, said node also containing information regarding said common leading bits for said subgroup.

2. A method according to claim 1 wherein said node structure further includes data indicating a number of members in a subgroup stored in said leaf structure.

3. A method according to claim 1 wherein said tree data structure includes a plurality of hierarchal levels, each level containing at least one node data structure, a level a containing at most an equal number of node data structures than level b where $a < b$.

4. A method according to claim 3 wherein for at least one of said plurality of levels, each node data structure contained in said at least one of said plurality of levels contains a pointer to a node data structure contained in another level.

5. A method according to claim 3 wherein binary number stored in a node data structure in level a_1 are used to determine said number x for a subgroup stored in a level b_1 wherein $a_1 < b_1$.

6. A method according to claim 3 wherein a new binary number is created using binary numbers in a subgroup stored in a level b_2, said new binary number being stored in a node data structure contained in a level a_2, wherein $a_2 < b_2$.

7. A method according to claim 3 wherein a new binary number is created using binary numbers from different subgroups stored in a level b_3, said new binary number being stored in a node data structure being contained in a level a_3, wherein $a_3 < b_3$.

8. A method of storing IP binary addresses in a tree data structure for use in a range search, the method comprising:

a) sorting a group of IP binary addresses in order of numerical value;

b) determining a number of sequential bits common to said group of IP binary addresses, said sequential bits being chosen from a group comprising:

- leading bits
- trailing bits.

c) removing said sequential bits common to said group of IP binary addresses from said IP binary addresses; and

d) storing said group in a node in said tree data structure.

9. A method according to claim 8 wherein said node also stores how many sequential bits were removed from said IP binary addresses.

10. A method according to claim 8 wherein said tree data structure has multiple levels with each level having at least one node.

11. A method according to claim 10 wherein said at least one element in a node in a level a_1 is

derived from contents of at least one node in a level b_1 where $a_1 < b_1$.

12. A method according to claim 10 wherein said group is stored in a node in a level b_2 and said number of sequential bits common to said group is determined using at least one IP binary address stored in a node in a level a_2, wherein $a_2 < b_2$.

13. A method according to claim 10 wherein at least one element in a node in a level a_3 is derived from sequential bits removed from IP binary addresses stored in a node in a level b_3, where $a_3 < b_3$.

14. A method according to claim 13 wherein said at least one element is created from common leading bits removed from said IP binary addresses.

15. A method according to claim 10 wherein said at least one element in a node in level a_3 is derived from common leading bits of IP binary addresses stored in different nodes in a level b_3, wherein $a_3 < b_3$.

16. A method according to claim 1 further including the step of, for each of subgroup, determining a number y of trailing bits common to members of said subgroup.

17. A method according to claim 16 wherein for step f), said stripped binary numbers are created by removing x leading bits and y trailing bits from members of said subgroup.

18. A method according to claim 16 further including the step of recording said number y of common trailing bits for each subgroup.

19. A method according to claim 17 wherein said node also contains information regarding said trailing bits for said subgroup.